NordStart

Kan strategisk placering af hjertestartere redde flere liv i Region Nordjylland?

Oplæg af PhD studerende, Læge, Niels Saaby Hald, Den Præhospitale Virksomhed, Region Nordjylland

Genoplivningskonferencen 27. november 2023

Dansk Førstehjælpsråd

DANSK RÅD FOR GENOPLIVNING

TrygFonden

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Dansk Førstehjælpsråd

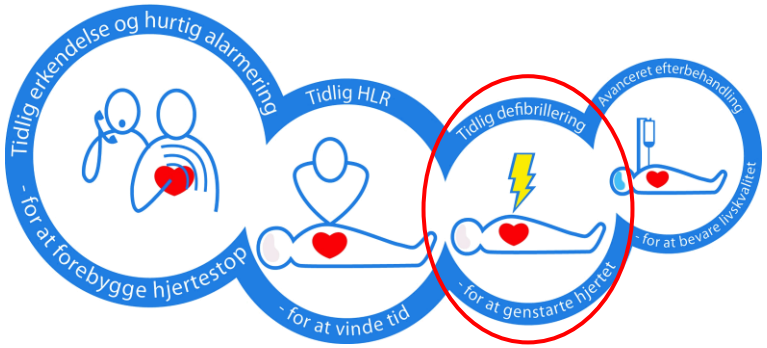
DANSK RÅD FOR GENOPLIVNING

TrygFonden

Overordnet opbygning

1. Opsætning af nye AED'ere
2. Førstehjælpsundervisning
3. Forskning

Baggrund



Resuscitation Science

Location of Cardiac Arrest in a City Center

Strategic Placement of Automated External Defibrillators in Public Locations

Fredrik Folke, MD; Freddy Knudsen Lippert, MD; Søren Loumann Nielsen, MD; Gunnar Hilmar Gislason, MD, PhD; Morten Lock Hansen, MD; Tina Ken Schramm, MD; Rikke Sørensen, MD; Emil Loldrup Fosbøl, MB; Søren Skøtt Andersen, MD; Søren Rasmussen, MSc, PhD; Lars Køber, MD, DMSc; Christian Torp-Pedersen, MD, DMSc

Background—Public-access defibrillation with automated external defibrillators (AEDs) is being implemented in many countries worldwide with considerable financial implications. The potential benefit and economic consequences of focused or unfocused AED deployment are unknown.

Methods and Results—All cardiac arrests in public in Copenhagen, Denmark, from 1994 through 2005 were geographically located, as were 104 public AEDs placed by local initiatives. In accordance with European Resuscitation Council and American Heart Association (AHA) guidelines, areas with a high incidence of cardiac arrests were defined

Journal of the American Heart Association

ORIGINAL RESEARCH

Effect of Optimized Versus Guidelines-Based Automated External Defibrillator Placement on Out-of-Hospital Cardiac Arrest Coverage: An In Silico Trial

Christopher L. F. Sun, PhD; Lena Karlsson, MD, PhD; Laurie J. Morrison, MD, MSc; Steven C. Brooks, MD, MHSc; Fredrik Folke, MD, PhD; Timothy C. Y. Chan, PhD

BACKGROUND: Mathematical optimization of automated external defibrillator (AED) placement may improve AED accessibility and out-of-hospital cardiac arrest (OHCA) outcomes compared with American Heart Association (AHA) and European Resuscitation Council (ERC) placement guidelines. We conducted an in silico trial (simulated prospective cohort study) comparing mathematically optimized placements with placements derived from current AHA and ERC guidelines, which recommend placement in locations where OHCAs are usually witnessed.

METHODS AND RESULTS: We identified all public OHCAs of presumed cardiac cause from 2008 to 2016 in Copenhagen, Denmark. For the control, we computationally simulated placing 24/7-accessible AEDs at every unique, public, witnessed OHCA location at monthly intervals over the study period. The intervention consisted of an equal number of simulated AEDs placements, deployed monthly, at mathematically optimized locations, using a model that analyzed historical OHCAs before that month. For each approach, we calculated the number of OHCAs in the study period that occurred within a 100-m route

JIM Review

doi: 10.1111/joim.12730

The challenges and possibilities of public access defibrillation

M. Ringh[1], J. Hollenberg[1], T. Palsgaard-Moeller[2], L. Svensson[1], M. Rosenqvist[3], F. K. Lippert[2], M. Wissenberg[2], C. Malta Hansen[2,4], A. Claesson[1], S. Viereck[2], J. A. Zijlstra[5], R. W. Koster[5], J. Herlitz[6], M. T. Blom[5], J. Kramer-Johansen[7,8], H. L. Tan[5], S. G. Beesems[5], M. Hulleman[5], T. M. Olasveengen[8], & F. Folke[2,4] for the COSTA study group (research collaboration between Copenhagen, Oslo, STockholm, and Amsterdam)

B06

What is the best location for a defibrillator to improve OHCA coverage?

Terry P Brown[1], Gavin D Perkins[2], Andy Rosser[3], Jenny Lumley-Holmes[3], Theodoros N. Arvanitis[4], Niro Siriwardena[5], Gareth Clegg[6], Lazaros Andronis[2], Charles Deakin[7], James Mapstone[8]

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[2]*Warwick Clinical Trials Unit, Coventry, United Kingdom;*
[3]*West Midlands Ambulance Service, Brierley Hill, United Kingdom;*
[4]*University of Warwick, Coventry, United Kingdom;*
[5]*University of Lincoln, Lincoln, United Kingdom;*
[6]*University of Edinburgh, Edinburgh, United Kingdom;*
[7]*Southampton General Hospital, Southampton, United Kingdom;*
[8]*Department of Health and Social Care, Bristol, United Kingdom*

Background: Studies have suggested various deployment strat-

diac arrest

OPTIMIZING RESIDENTIAL AUTOMATED EXTERNAL DEFIBRILLATOR COVERAGE BY TARGETING SOCIAL HOUSING AREAS

rgensen*, [1,2]JS Kjoelbye, [3,4]F Ettl, [4,5]M Krammel, [1,2]NB Christensen, [6]KB Ringgren, p-Pedersen, [1,2]F Folke, [1,8]CM Hansen. [1]*Emergency Medical Services Copenhagen,* rk; [2]*Faculty of Medicine, Copenhagen University, Denmark;* [3]*Department of* ncy Medicine, Medical University of Vienna, Austria; [4]*PULS – Austrian Cardiac Arrest* ness Association; [5]*Emergency Medical Service Vienna, Vienna, Austria;* [6]*Department* diology, Aalborg University Hospital, Denmark; [7]*Department of Cardiology, North* d Hospital, Denmark; [8]*Department of Cardiology, Rigshospitalet, Denmark*

36/bmjopen-2022-EMS.19

ground Strategies for deployment of automated external rillators (AEDs) in residential areas are warranted. Social ing is widespread in Europe, has a high frequency of -economic predictors for out-of-hospital cardiac arrest,

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Clinical paper

Novel relocation methods for automatic external defibrillator improve out-of-hospital cardiac arrest coverage under limited resources☆

Nicholas John Tierney[a,b,c], H.Jost Reinhold[d], Antonietta Mira[d,e], Martin Weiser[f], Roman Burkart[g], Claudio Benvenuti[g], Angelo Auricchio[g,h,i,*]

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ARTICLE INFO

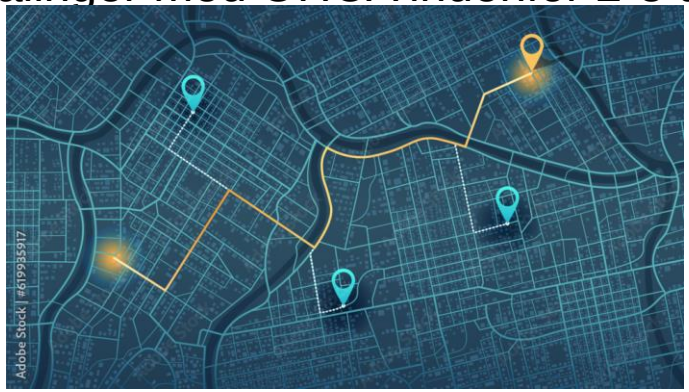
Keywords:
Cardiac arrest
Automated external defibrillation
Cardiopulmonary resuscitation
Defibrillation
Resuscitation

ABSTRACT

Background: Mathematical optimisation models have recently been applied to identify ideal Automatic External Defibrillator (AED) locations that maximise coverage of Out of Hospital Cardiac Arrest (OHCA). However, these fixed location models cannot relocate existing AEDs in a flexible way, and have nearly exclusively been applied to urban regions. We developed a flexible location model for AEDs, compared its performance to existing fixed location and population models, and explored how these perform across urban and rural regions.
Methods: Optimisation techniques were applied to AED deployment and OHCA coverage was assessed. A total of 2802 geolocated OHCAs occurred in Canton Ticino, Switzerland, from January 1st 2005 to December 31st 2015.
Results: There were 719 AEDs in Canton Ticino. 635 (23%) OHCA events occurred within 100 m of an AED, with 306 (31%) in urban, and 329 (18%) in rural areas. Median distance from OHCA events to the nearest AED was 224 m (168 m urban vs. 269 m rural). Flexible location models performed better than fixed location and population models, with the cost to deploy 20 new AEDs instead relocating 171 existing AEDs to new locations, improving OHCA coverage to 38%, compared to 26% using fixed models, and 24% with the population based model.
Conclusions: Optimisation models for AEDs placement are superior to population models and should be strongly considered by communities when selecting areas for AED deployment. Compared to other models, flexible location models increase overall OHCA coverage, and decreases the distance to nearby AEDs, even in rural areas, while saving significant financial resources.

Antagelser og forudsætninger

Nuværende ”logisk tankegang”, ”afhængigt af lokale initiativer”
Anbefalinger med OHCA indenfor 2-5 år



Optimering af AED placering ud fra algoritme:
- Melsen Fonden (Nordjysk fond)
- Fokus på yderområder i RN – længere responstid
- Aalborg, Nørresundby & Hjørring ekskluderet

Opsætning af hjertestartere – Hvad?

280 x Nihon Kohden Cardiolife AED-3100

280 x CA HSS100 Hjertestarterskab

GPS Tracker

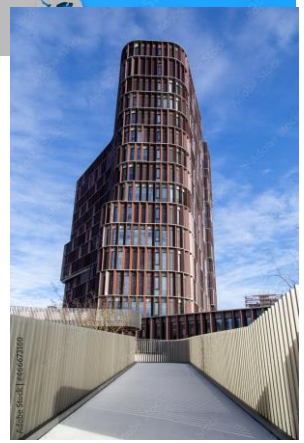
Tilmelding til hjertestarternetværk

Opsætning og 5 års service

https://www.freelancer.com/contest/Handyman-cartooncaricature-304975

Algoritmen

- Internationalt samarbejde
- Simulationsstudie I København (2020)
  - Matematisk optimeret placering af AED (#393)
  - Øger dækning 50% (24.2%)
  - Dækningsradius = 100 meter
  - Ikke signifikant ændring I defibrillering og overlevelse, men trend
  - 100 AED vs 1500 AED



Journal of the American Heart Association

ORIGINAL RESEARCH

Effect of Optimized Versus Guidelines-Based Automated External Defibrillator Placement on Out-of-Hospital Cardiac Arrest Coverage: An In Silico Trial

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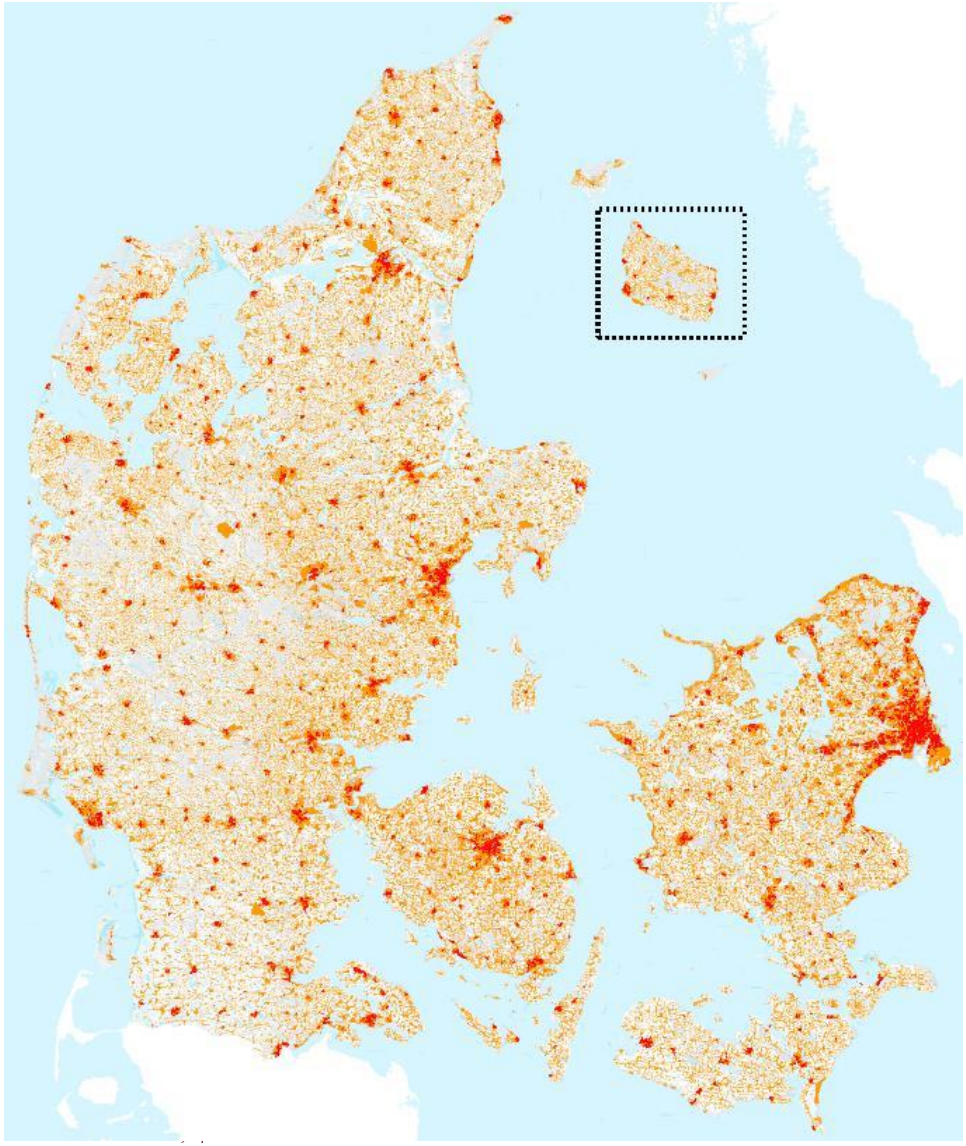
Algoritmen – Input

- Alder
- Immigrations- og uddannelsesstatus
- Befolkningstæthed
- Arbejdsstyrke
- Point of public interest
- Historisk Incidens

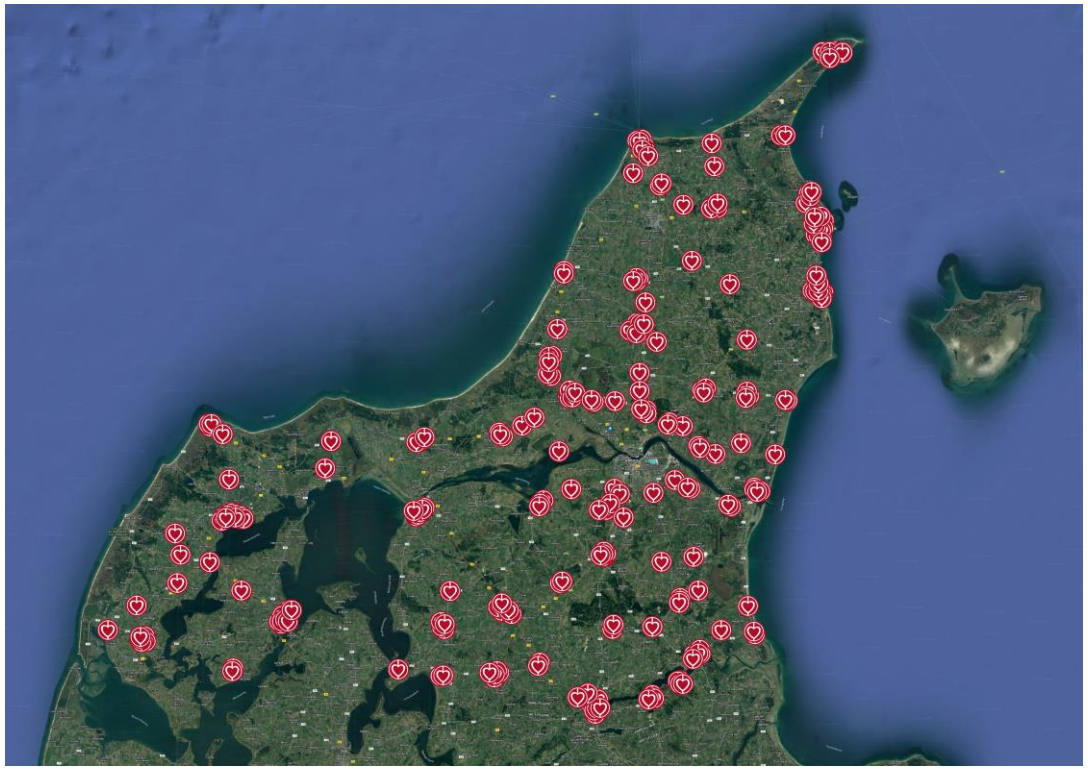
Algoritmen – Output

- Risikovurdering for OHCA i DK
- Forventet årlig risiko på hektarniveau



Opsætning af hjertestartere – Hvor?

- Risikoberegning for hver enkelt ny placering
- Dækningsradius 250 meter
  - Nuværende AED placeringer
- Mest risikoområde med færrest AED
- Mest risikoområde pr AED
- Prioriteret nummering 1-280

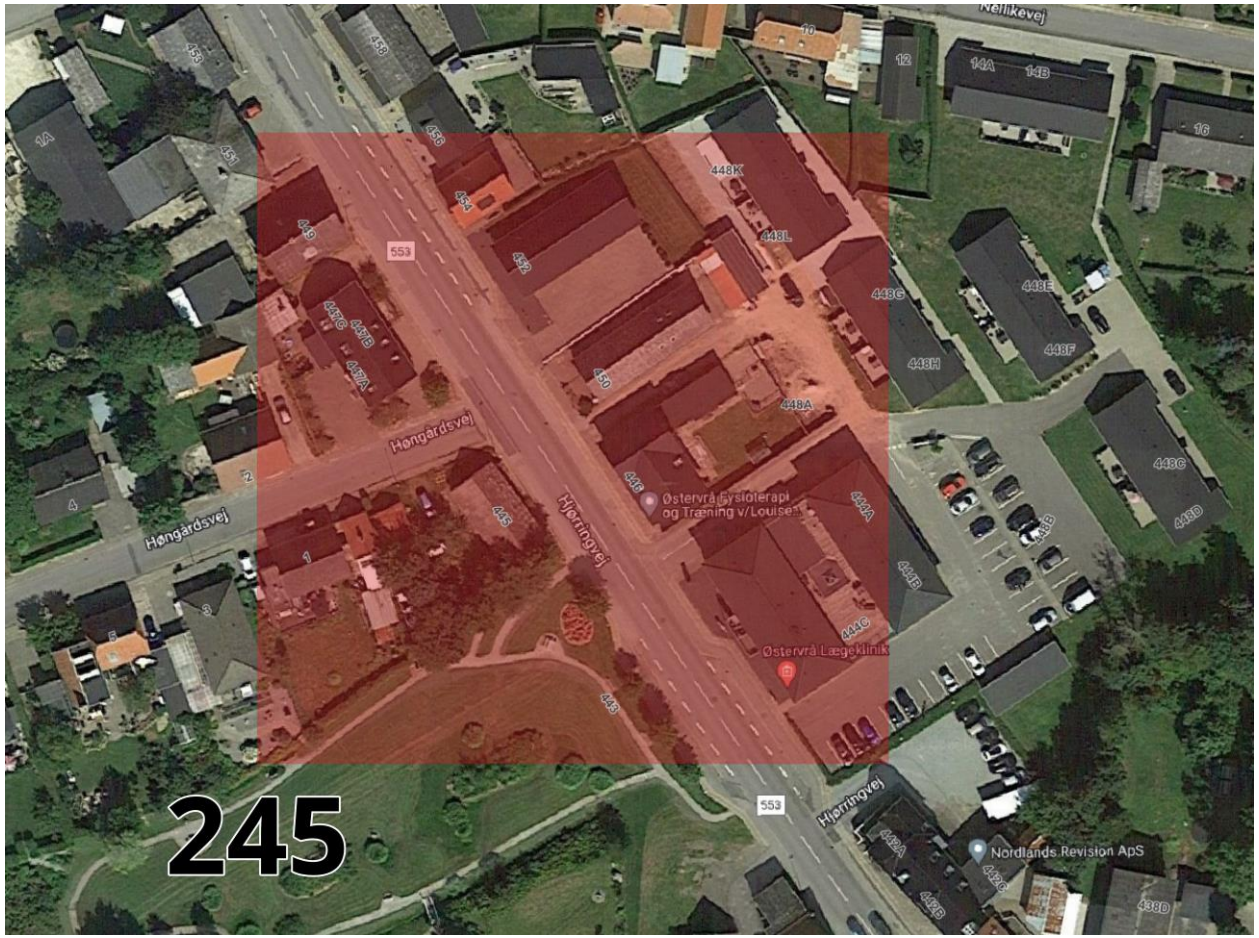


Opsætning af hjertestartere – Hvor?

- 100x100 meter koordinatsæt
- Elastik til matrikler på "grænsen"

Opsætning af hjertestartere – Hvor?

- 100x100 meter koordinatsæt
- Elastik til matrikler på "grænsen"
- Oplagte steder?
- Dialog med beboerne
  - *Overvejende positiv indstilling*
  - *MEN… Udseende, strøm, service*
- Re-kørsel
  - Ny AED efter datatræk
  - Ikke registreret AED
  - Få matrikler, ingen aftale

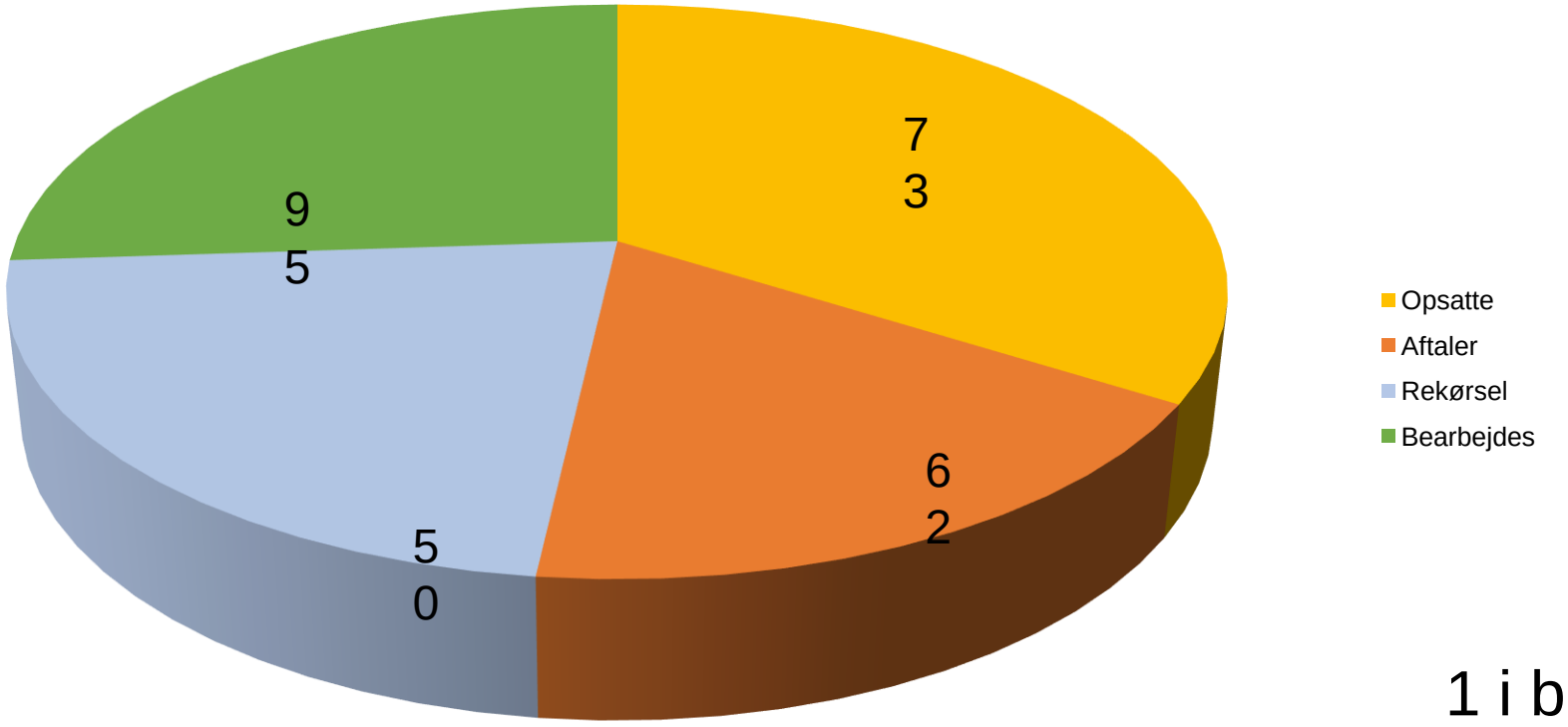


Opsætning af hjertestartere – Hvem?

- Frivillige i lokalforeninger
- Eksterne frivillige
  - *Hjerteløbere, akuthjælpere*
- Hjerteforeningens ansatte

SUCCES
!

Opsætning af hjertestartere – Status



1 i brug
2 ude af skab

Førstehjælpstræning

- Giv liv: Hjerteredderkurser
  - *30 minutter*
  - *Gratis (private)*
  - *Min. 5 personer*

https://hjerteforeningen.dk/giv-liv/

Forskningen

- Flere AED anvendt efter strategisk opsætning?
  - Manglende power til overlevelse
- Arbejde med AED database

Spørgeskemaundersøgelse;

- Øget tryghed i befolkningen?

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